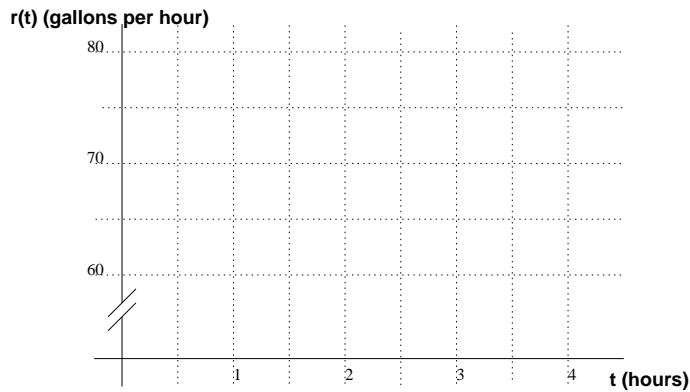


- (3.) (9 points) A large tank is being filled with water. The flow rate of water into the tank, in units of gallons per hour, is given by

$$r(t) = 70 + 10 \cos\left(\frac{\pi t}{2}\right),$$

where t is measured in hours.

- (a) Sketch an accurate graph of $r(t)$ on the following axes.



- (b) Use a definite integral to express the area under the graph of $r(t)$ between the vertical lines $t = 0$ and $t = 3$.

- (c) What is the practical meaning of integral in part (b)? Be sure to include units in your answer.

- (d) Give an expression for the average flow rate between $t = 0$ and $t = 3$? Do not estimate—i.e., leave your answer as a formula.